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| 10/556,232 | 10/12/2006 | Tim Haulick | 11336-1204 (P03088US) | 3703 |
| 757 7590 11/28/2007 BRINKS HOFER GILSON & LIONE P.O. BOX 10395 CHICAGO, IL 60610 | | | EXAMINER PAUL, DISLER | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/556,232 | Applicant(s) HAULICK ET AL. | |
| | Examiner Disler Paul | Art Unit 2615 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/12/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1/27/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3,5-6,8,10-11,14-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Yang et al. (US 7,206,418 B2).

Re claim 1, Method for enhancing communication in a noisy environment comprising: receiving input signals emanating from at least two microphone arrays each comprising at least two microphones (fig.2; col.1 line 55-64/multiplied microphones may be arranged in arrays) and processing the input signals of each microphone array by a beamformer to determine temporal and spatial information about the input signals of each microphone array (fig.1-3 wt (212); col.3 line 10-20; col.6 line 1-3; fig.7; col.13 line 1-15/detected signal time aligned and control with beamformer dependent on known source distance and sensors).

Re claim 2, the method according to claim 1, wherein processing the input signals of each microphone array comprises processing by a wanted signal beamformer to obtain a wanted signal and by a blocking beamformer to obtain a blocking signal, preferably wherein the wanted signal beamformer is an adaptive beamformer (fig.2 wt (212); fig.3; col.5 line 1-37).

Re claim 3, the method according to claim 2, wherein processing the input signals of each microphone array further comprises deciding whether a signal is transmitted from a wanted signal direction, wherein the wanted signal beamformer is an adaptive beamformer being adapted only if no signal is transmitted from the wanted signal direction (col.11 line 36-41/signal may be adapted during time of non speech activity; col.10 line 44-51; fig.5 with col.8 line 5-20).

Re claim 5, the method according to one of the preceding claims, further comprising detecting speech activity for each microphone array (col.1 line 14-17; line 34-47).

Re claim 6, the method according to claim 5, wherein detecting speech activity for a microphone array comprises: determining a wanted signal power, a blocking signal power, and a background noise signal power, comparing the wanted signal power with the blocking signal power and

the background noise signal power (col.5 line 52-61, fig.2 wt (242); detect speech based on wanted/block and background signal as speech control signal).

Re claim 8, the method according to one of the claims 5-7, further comprising applying an attenuation to the processed input signals of a microphone array if no speech activity is detected for the microphone array (col.1 line 40-47; fig.2 (230)).

Re claim 10, the method according to one of the preceding claims, wherein processing comprises adaptively determining a gain control of the input signals for each microphone array (col.7 line 45-50; col.8 line 50-55).

RE claim 11, the method according to claim 10, wherein determining a gain control is performed adaptively (col.8 line 50-55/gain performed for each signal).

Re claims 14-15 have been analyzed and rejected with respect to claim 1.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 12-13,16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al. (US 7,206,418 B2) and further in view of Breed et al. (US 2001/0038698 A1).

Re claim 12, the method according to one of the preceding claims, However, Yang et al. fail to disclose of the further comprising selecting at least one output channel out of at least two output channels on which the processed signals are to be output. However, Breed et al. disclose of a sound system with cellular telephone wherein selecting at least one output channel out of at least two output channels on which the processed signals are to be output (page 2 par[0011,0130-0131], fig.1-5/vehicle system with telephones with processor) for the purpose of optimizing the comfort of the occupant, the reception of desired sound from the system. Thus, taking the combined teaching of Yang et al. and now Breed et al. as a whole, it would have been obvious for one of the ordinary skill in the art to have modify Yang et al. by incorporating the selecting at least one output channel out of at least two output channels on which the

processed signals are to be output for the purpose of optimizing the comfort of the occupant, the reception of desired sound from the system.

Re claim 13, the Method according to claim 12, wherein selecting the at least one output channel comprises determining an amplification for each selected output channel (par [0133-0135]/sound may be customized for each occupant).

Re claim 16, Yang et al. disclose of the Communication system comprising: at least two microphone arrays each comprising at least two microphones to produce microphone signals, at least one analog/digital converter having an input for receiving said microphone signals and an output for providing digital microphone signals ((fig.2; col.1 line 55-64; col.4 line 58-62), digital signal processing means having an input for receiving the digital microphone signals, being configured to process the digital microphone signals of each microphone array by a beamformer to determine temporal and spatial information about the microphone signals of each microphone array (fig.1-3 wt (212); col.3 line 10-20; col.6 line 1-3; fig.7; col.13 line 1-15), and having an output to provide processed output signals (fig.4-6 wt $y(t)$).

However, while, Yang et al. disclose of a having the many devices for suppressing noise in an environment and outputting (col.14 line 8-13). But, Breed et al. disclose of a sound system with cellular telephone wherein the device outputting the signal specifically to at least two loudspeakers (page 2 par [0011,0130-0131,0135], fig.2 (240)/vehicle system with telephones with processor) for the purpose of optimizing the comfort of the occupant, the reception of desired sound from the system. Thus, taking the combined teaching of Yang et al. and now Breed et al. as a whole, it would have been obvious for one of the ordinary skill in the art to have modify Yang et al. by incorporating the outputting the signal specifically to at least two loudspeakers for the purpose of optimizing the comfort of the occupant, the reception of desired sound from the system.

Re claim 17, the Communication system according to claim 16, wherein the digital signal processing means is further configured to detect speech activity for each microphone array (col.1 line 14-17; line 34-47).

Re claim 18, the Communication system according to claim 17, wherein the digital signal processing means is further configured to

determine and apply an attenuation to the processed digital microphone signals of a microphone array if no speech activity is detected for the microphone array (col.1 line 40-47; fig.2 (230)).

Re claim 19 has been analyzed and rejected with respect to claim 12.

Re claim 20, a vehicle cabin comprising a communication system according to claim 16, and at least two loudspeakers, wherein each microphone array and each loudspeaker is associated with a passenger seat (breed, fig.1-5).

5. Claims 4, 7,9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al. (US 7,206,418 B2) and further in view of Official Notice.

Re claim 7, the method according to claim 6, further comprising comparing the wanted signal powers of at least two microphone arrays (col.7 line 9-15; col.12 line 10-20/all signals with wanted and noise have spectrum power calculated), However, Yang et al. fail to disclose of the determining a highest power, However, official notice is taken the concept of calculating the highest power of signals is commonly known in the art, thus it would have been obvious for one of the ordinary skill in the art to have incorporated the concept of

determining a highest power of signal for detecting the period of speech activity.

Re claim 9, Yang et al. disclose of the method according to claim 8, wherein applying the attenuation is performed adaptively (see claim 8 above), However, Yang et al. fail to disclose of the specific wherein varying the attenuation in predetermined time steps between zero attenuation and a predetermined maximum attenuation. However, official notice is taken the limitation of doing attenuation wherein the attenuation in predetermined time steps between zero attenuation and a predetermined maximum attenuation is commonly known in the art, thus it would have been obvious for one of the ordinary skill in the art to have incorporated the attenuation in predetermined time steps between zero attenuation and a predetermined maximum attenuation for suppressing noise signal.

Re claim 4, the method according to claim 3, wherein deciding comprises determining a wanted signal power and a blocking signal power with adaptability of gain of a time constant of ratio of wanted signal and blocking signal (col.8 line 5-20, fig.2/power spectrum of blocking and wanted signal), However, Yang et al. fail to disclose of the specific wherein the wanted signal beamformer is adapted only if the blocking signal power is larger than a predetermined constant

times the wanted signal power. However, official notice is taken the limitation of adapted only if the blocking signal power is larger than a predetermined constant times the wanted signal power is simply

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Disler Paul whose telephone number is 571-270-1187. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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PRIMARY EXAMINER